Chapter

Planning for Sustainable Tourism Based on Green Infrastructure: A Multiscale Methodology for Revitalizing Depopulated Rural Landscapes

Cláudia Oliveira Fernandes and Giulia Olivetti

Abstract

The abandonment and decline of rural regions are conveying huge challenges to their planning and management. The extraordinary natural and cultural values the landscapes of these regions usually display, coupled with the growing need for urban populations to reconnect with nature, have led to an increased demand for these territories for tourism activities. However, the high sensibility of most of these landscapes requires that the promotion of tourism activities be well thought out and regulated. Therefore, it is necessary to devise strategies to implement a sustainable tourism that can boost the economy and secure the population and, simultaneously, protect the values in presence. In this chapter, a methodology is proposed that approaches the landscape planning from a multiscale perspective, based on (1) a macroanalysis grounded on green and blue infrastructures, (2) the delimitation of areas with distinct landscape character, (3) the identification and requalification of strategic microsites and links following a rural acupuncture concept, and (4) the implementation of a local sustainable tourism network that is expected to have a broad impact in the whole region. The applicability of the proposed methodology was tested in a case study in the north of Portugal, specifically in the Olo river basin.

Keywords: landscape planning, landscape management, depopulation, key landscape points, rural acupuncture, connectivity, sustainable tourism network, institutional cooperation

1. Introduction

Across Europe there is a growing trend of depopulation and landscape degradation in remote rural areas, especially in mountain areas [1]. These regions are then in need for special attention from government entities, and it is urgent to define and implement strategies for their planning and management.

Different management models have been debated over the years, with rewilding gaining momentum. Rewilding proposes a landscape management concept for rural depopulated regions in which active management is reduced and nature is

allowed to manage itself [2]. However, many of these landscapes are sought after and appreciated due to the judicious balance between the marks of human presence such as villages, terraced fields, shelters, footpaths, etc. and the patches of wild forests and other natural habitats. Thus, it is foremost important to ensure that local populations remain in the region and actively manage the green infrastructure and the mosaic as they are primarily responsible for the special atmosphere that these landscapes emanate.

One of the reasons that lead people to abandon these regions is that traditional agriculture, with low productivity and demanding a great work effort, scarcely guarantees a sufficient income for a comfortable modern life [3]. Therefore, it is up to government entities to support measures that allow the implementation and growth of complementary economic activities to obtain income.

In recent years there has been a growing demand for these regions by urbanites who seek relief from everyday stress in connection with nature [4]. These regions, full of tradition, history, and natural values, can offer, if properly prepared, a diverse range of activities and recreational opportunities for these tourists. However, it is important to note that the high sensitivity of these landscapes is incompatible with the construction of infrastructures of great visual impact such as those usually built up to accommodate mass tourism [5–7].

Sustainable tourism, or ecotourism, has therefore been indicated as an adequate strategy for the revitalization of these regions insofar, as it focuses on the sustainable use of environmental resources, respecting the sociocultural authenticity of the host communities and ensuring sustainable economic operations in the long term. In this model the benefits are provided to all stakeholders, and opportunities, such as the possibility for stable income and employment for the host communities, are appropriately distributed [8–11].

The work presented in this chapter assumes that the implementation of sustainable tourism network must be based on the local green and blue infrastructure, as these already offer a connected network of values, requiring only the identification of the elements (and the links between them), in need of intervention. These interventions are expected to be small scale and low investment, taking place at key components of the metabolism of the landscape. In this way, surgical actions in these components will have a significant and comprehensive impact, far beyond the place where it was operated, influencing the economic and social dynamics of the entire region. That is why we call this assumption—rural acupuncture.

The objectives of this chapter are to propose a methodology for the identification of these landscape components, following a multiscale approach to the landscape, and point out guidelines for their recovery. In the end it should be possible to design a sustainable tourism network, integrating all the cultural and natural values.

The applicability of the proposed methodology was tested in a rural region in northern Portugal, the Olo river basin.

1.1 Sustainable tourism: definition, development, and strategies

Sustainable tourism is a viable sustainable development strategy based on the relationship between man and nature. At the heart of this relationship, there is the correlation between wild and protected areas, with a strong human presence. Specifically, ecotourism can be defined as "Responsible travel to natural areas that conserves the environment and sustains the well-being of local people" [12] and is the fastest-growing sector in the global tourism industry [13]. This growth is primarily due to recognition of the many benefits that this type of tourism can bring to the environment, especially with the renewed concern for climate change and the exploitation of natural resources.

Still, the benefits for local communities, and to tourists actively involved, are gaining relevance [14]. For the environment, sustainable tourism allows a targeted control and protection of natural resources and, at the same time, provides an economic incentive for the implementation of land conservation plans. For local communities, there will be benefits in all territorial levels. For the residents, on a local scale, the advantages will be the development of local trade and the creation of new job positions, encouraging residents not to move to large cities. In addition, investments will be made to protect the environment, which will contribute to the maintenance of biodiversity. At the regional level, local products will enter the market on a wider scale. At the national level, exchange with foreign markets will be crucial, and the capital invested will be retained instead of exported [15].

For tourists, there will certainly be social and psychological benefits. The reconnection with nature, education, and personal growth will lead to greater sensitivity for visitors. Volunteering and financial contribution will also lead to satisfactory activities and may lead to social interactions, which will enable new knowledge and a sustainable lifestyle to be acquired.

However, consideration must be given to the possibility that even sustainable tourism can also adversely affect the environment. First of all, services have to be well managed in order to limit carbon emissions. Moreover, it is possible that local communities, instead of improving and growing economically, are denaturalized; thus it is rather important to preserve their local traditions. Also, profits may not always be used for land conservation funds [14]. For all of these reasons, it is advisable to set up a committee and a plan to regulate sustainable tourism and prevent it from degenerating and damaging instead of protecting.

1.2 Green and blue infrastructure: definition and application in rural land management

Green infrastructure can be defined as a natural or seminatural network of green (soil covered or vegetated like forests, riparian galleries) and blue (water covered by rivers, streams, lakes, oceans) spaces and corridors that maintain and enhance ecosystem services [16, 17]. Its ultimate goal is to support and maintain a healthy ecosystem and the physical and psychological well-being of humans.

This strategy is based on the identification of areas providing ecosystem services, with reference to multiple benefits people can derive from nature [18], creating a network that accumulates and distributes these services throughout the territory [19]. For the implementation of the green infrastructure to be successful, there needs to be collaboration between local communities, landowners, and organizations, to identify, design, and maintain a system, locally, but not only [20].

The importance of green infrastructure is its ability to act on different scales, ranging from local projects to transnational ecological networks. This difference in scale is also reflected in the approach of this strategy, which is based on principles applicable to each type of territory. The basic principles of green infrastructure planning are divided into approaches based on green structures and approaches based on government policies [19].

As for the former, first of all, the integration is important with all the structures and infrastructures present in the territory (e.g., gray structure); the second essential element is the multifunctionality of the strategy, which has an ecological, social, economic, and cultural function.

As far as government policies are concerned, the approach must be long term, with benefits for every single actor involved (local community, landowners, organizations, and government). In addition, social inclusion must be envisaged, enabling the community to participate actively in the various design processes. This will

allow a collaboration that will lead to an integrated solution, based on a multidisciplinary approach, allowing it to bring benefits throughout the network.

These benefits may include pollution mitigation, boost in economic value, improvement of built structures, and increase in the scenic value of the landscape.

2. A multiscale methodology to implement a sustainable tourism network

The methodology proposed in this chapter is based on four steps, where the landscape is approached from a multiscale perspective starting from a broader overview; the focus is narrowed down to the identification of strategic microsites, in which surgical interventions will help to revitalize the territory in its entirety. The methodology is graphically represented in **Figure 1**.

2.1 Macroanalysis grounded on green and blue infrastructures

In a first step, a macro and thorough analysis should be conducted in order to gain an in-depth knowledge of the territory, allowing the understanding of all the landscape features.

Biophysical variables, such as geology, slopes, altitudes, the network of natural and man-made waterways, and flora and fauna biodiversity, and socioeconomic variables, such as demography, settlements, and the road network, should be comprehensively analyzed and correlated.

Other features can also help to identify distinct characteristics of the territory under analysis, for example, the prevalence of some tree and shrub species over others and the location and shape of production areas, both natural and man-made, throughout the territory. The state of conservation of the natural and cultural heritage also plays a key role in this landscape characterization.

Moreover, grounded on green infrastructure as a strategy for the recovery and protection of the natural and cultural heritage, it is possible to draw up guidelines for the application of specific measures that help transform tourism into ecotourism. So, first it is important to recognize if there are areas already included in this network and to check if legislation and specific management are required. Furthermore, this structure helps to understand which green corridors exist and which are the waterways with the greatest impact in the territory.

2.2 Delimitation of areas with distinct landscape character

By overlapping the maps produced in previous step, it is possible to identify and classify areas where singular features produce unique landscape characteristics, that is, areas with distinct *landscape character*. These areas as proposed by [21] "display recognisable and consistent pattern of elements that makes one landscape different from another, rather than better or worse." All of the identified areas, from now on called *landscape units*, have to be assessed for their qualities and fragilities; this should allow to understand which approach is best to follow for their revitalization.

For instance, a more "humanized" character will lead to major attention to the repair and valorization of man-made structures, while areas with the prevalence of natural character will shift the focus on the preservation of the native habitats and biodiversity. Usually, in depopulated remote rural areas, a mixed approach is required, demanding attention for both the cultural and the natural heritage.

An important output of this step is, therefore, the deeper knowledge it allows regarding the *landmarks* (natural or cultural components of the landscape, with

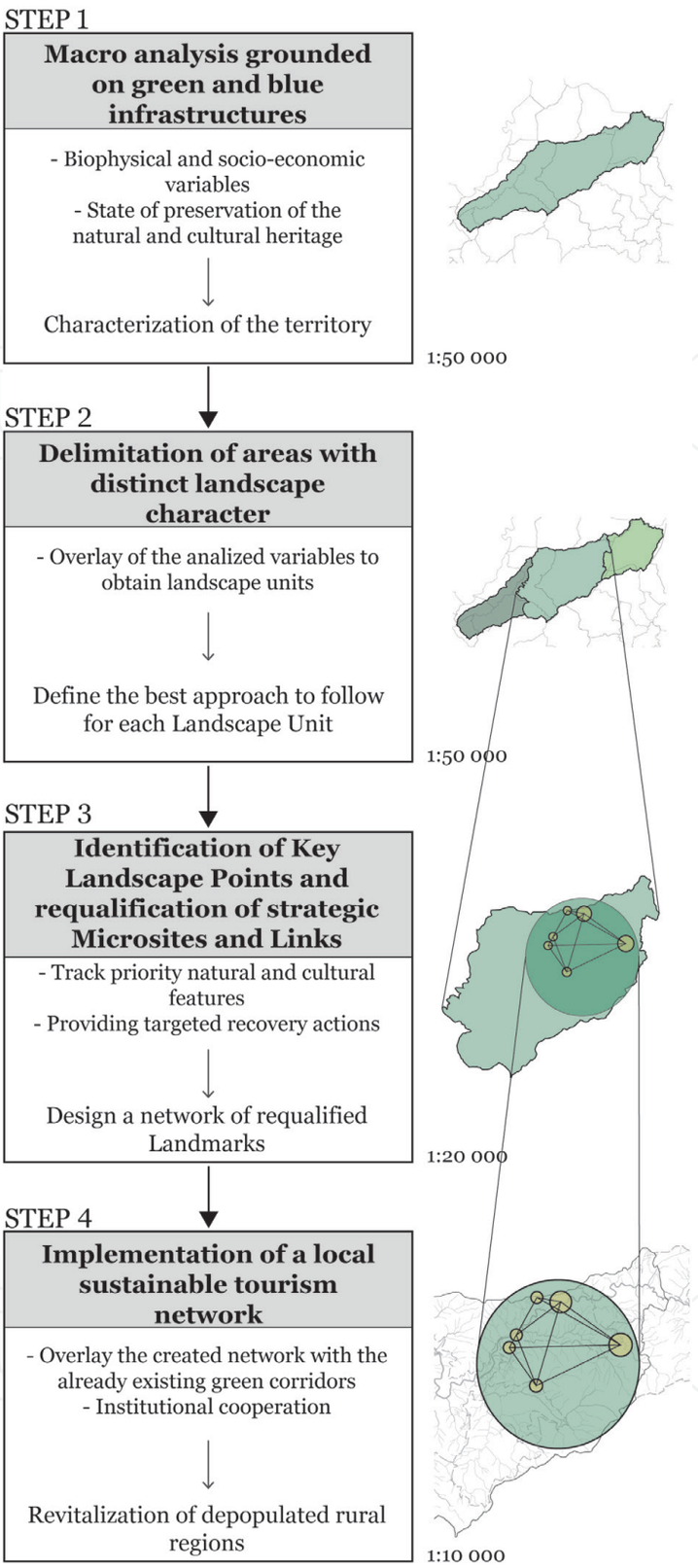


Figure 1.
Schematic diagram of the methodology. Note: The image scales are merely indicative.

high scenic value) of the region, as they will be instrumental for the next step of the methodology.

The definition and mapping of distinct landscape units will also help to identify priority areas for intervention, which, in an ever-present context of scarcity of financial resources for the implementation of these projects, can be important. Another advantage is that by reducing the scale of intervention, it will be easier to plan and implement the needed requalification actions.

2.3 Identification of key landscape points (KLP) and requalification of strategic microsites and links

After having located and characterized each landscape unit, it is now possible to identify *key landscape points*. These are places with a high concentration of landmarks, or where landmarks of extreme importance and rarity are positioned. Also important is to identify and evaluate the state of preservation of these landmarks and the preexisting connections (links) between them and the green infrastructure. These landmarks can be both man-made structures (e.g., bridges, mills, religious structures) and natural components, such as native forests, rocky outcrops, and waterfalls. Furthermore, the road network, as well as trekking and hiking trails, must also be taken into consideration. We call the landmarks in need for any type of requalification actions as *microsites*. Understanding which of these microsites are instrumental for the metabolism and dynamics of the territory, and providing them targeted recovery actions, is the basis of the implementation of a sustainable tourism network. We can, at this point, establish a metaphor with acupuncture, as by intervening in a very small-scale site, we expect to have profound and holistic impact on the whole region.

Considering the high visual sensitivity these landscapes usually display, interventions must be discreet and carefully thought out, in order to preserve the identity and character, both of the landscape unit and of the region. Examples can be taken from recovery of abandoned residential buildings following traditional technics and materials, cleaning of trekking paths, and introduction of information boards.

2.4 Implementation of a local sustainable tourism network

The requalification of microsites and links leads to the creation of a structured grid from which institutions devoted to regional planning and development can cooperate to plan a sustainable tourism network. However, as abovementioned, the implementation of this strategy has also, and primarily, to be based on the green and blue infrastructure (existing green corridors, waterways, forests).

It is expected that the addition of new important tourism services and facilities, further to the improvement and creation of a usable and recognizable pedestrian network, will increase visitation and the development of tourist activities. New activities will bring new jobs, leading to the flourishment of local businesses. This will allow the resident population to continue living in traditional villages, countering the rural exodus. Finally, a sustainable tourism network can also bring benefits to the natural environment. Responsible tourism will not damage the local habitats, flora, and fauna, but, instead, it will create opportunities to increase the knowledge of these values and, thus, the willingness to protect them.

In the next chapter, we will exemplify how the described methodology can be applied in practice.

3. Application of the proposed methodology to Olo river basin

The Olo river basin is located in the north region of Portugal. It covers an area of 13,500 hectares, including the municipalities of Amarante, Mondim de Basto, and Vila Real. The Olo River has approximately 36 km, from its source in Lamas de Olo, Vila Real, to its mouth in the Tâmega River, in Amarante (**Figure 2**).

Approximately 85% of the Olo river basin is part of the Natura 2000 network, namely, the "Alvão-Marão" Community Importance Site (PTCON0003). Moreover,

the East section is within a protected area, in the Alvão Natural Park, corresponding to 42% of the river basin.

Most of the population is settled in small remote villages, which have a built heritage that still retains part of its authenticity. However, with the growing depopulation of the inner area of the Olo river basin, most of the villages already exhibit several abandoned buildings, reflecting a progressive degradation of the inhabited centers. Still, even with the progressive abandonment of these settlements, the agroforestry mosaics continue to persist, with traditional systems such as meadows, agricultural terraces, and highland pastures.

Understanding the dynamics of a complex landscape such as the Olo river basin calls for an integrated methodology that encompasses the study of the factors that intervened in its genesis, as well as an analysis of the factors that are responsible for its current situation and its further development. Starting from this, the previously described methodology was then applied to this region.

3.1 Macroanalysis grounded on green and blue infrastructure

This analysis revealed a diverse territory, with a mostly wild and mountainous character, marked by steep topography and relevant waterlines (**Figure 3**).

The hydrography of the Olo river basin is characterized by its high branching, with the most important tributaries being the Ribeira da Fervença and the Rio Sião. These waterlines are vital due to the significant flow, extension, ecological, environmental, and landscape value and also to its importance in the supply of water for villages like Ermelo and Fervença.

Different geological formations are observed. In the central area, the schist predominates, which also abounds in the west, alternating with phyllites. The East Area is dominated by granite, and it is also the area with the highest altitude (>1200 m), sparser vegetation, and where water courses become less frequent.

The valley of the Olo River is then characterized by a rugged relief, dramatic geographical features, and waterfalls of a high landscape, geological, and scientific interest. However, the orography is clearly diluted from East to West, where most of the agricultural activity occurs, predominantly on terraces supported by schist walls.

In the forest cover, mature and expressive riparian forests stand out dominated by *Quercus robur*, *Fraxinus angustifolia*, *Betula alba*, *Salix atrocinerea*, *Corylus avellana*, and *Laurus nobilis*, among other species. Native hardwood and softwood

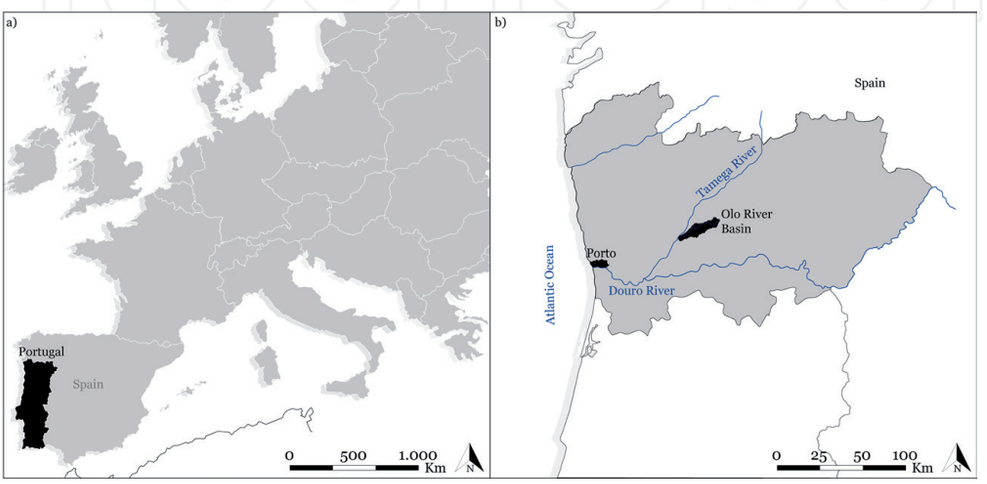


Figure 2.
Left, location of Portugal in Europe; right, location of Olo river basin in the north of Portugal.

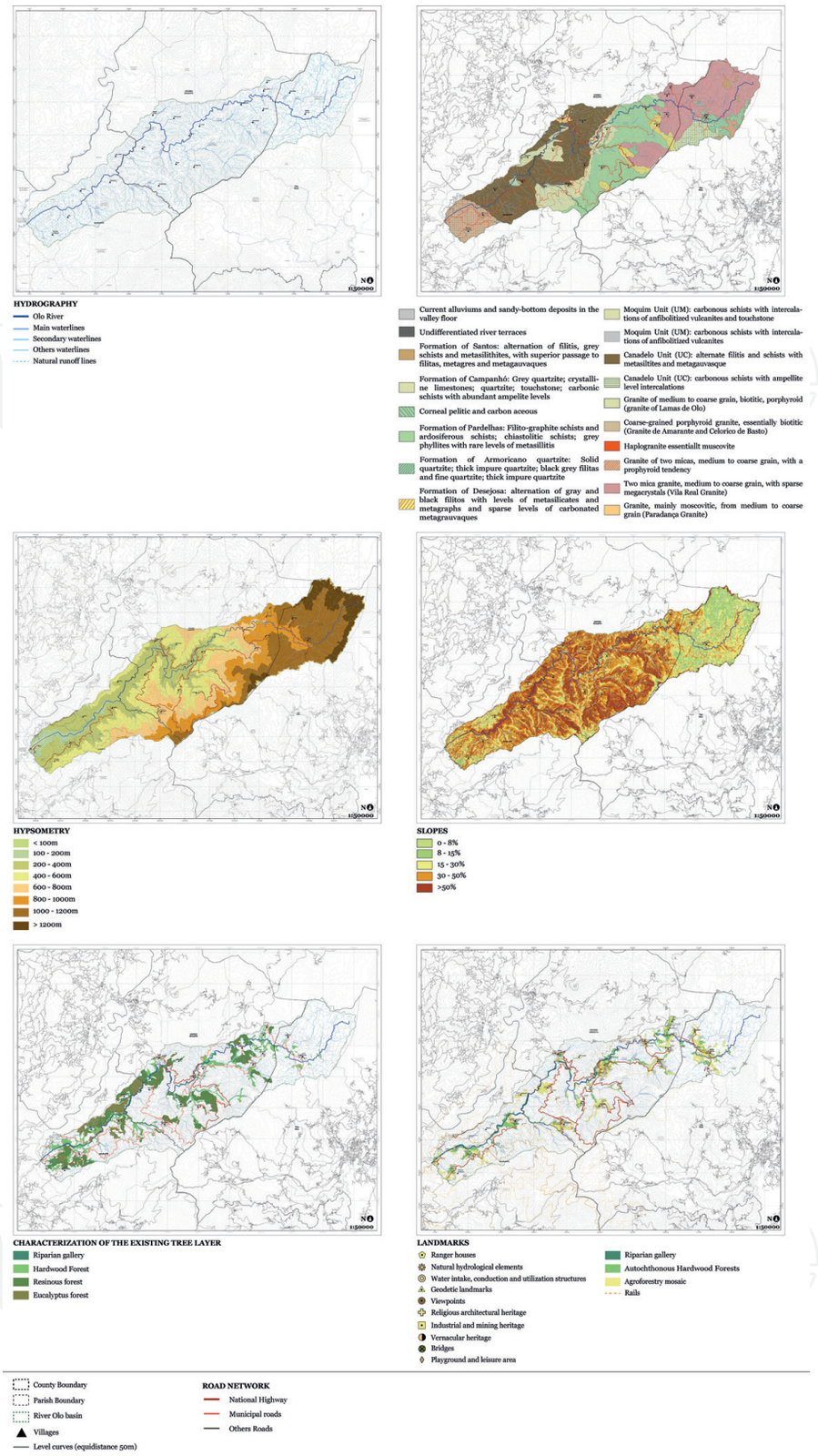


Figure 3.
Map analysis. From bottom left to lowest right: hydrography, geology, hypsometry, slopes, forest cover, and landmarks.

forests dominated by *Quercus* and *Pinus* species are also frequent. Some spots of exotic species (*Eucalyptus globulus*) suitable to produce timber also occur, especially in the northwest area. In higher altitude areas, there is, of course, a dominance of *Quercus pyrenaica* and *Betula alba*. In valley areas with good sun exposure, we also find cork oaks and arbutus trees associated.

Apart from a national road that crosses the majority of the territory, the regional and municipal road networks are poorly maintained and badly distributed, leaving many villages insufficiently served and almost unreachable.

The presence of man is conspicuous but, at the same time, well harmonized with the landscape. Natural and built heritage is abundant, translating the strong relationship between man and nature. The center of this relationship is the Olo River, a forceful natural element that strongly influenced the way man interacted with the territory. Unfortunately, the current degradation of many of these landmarks unveils that this symbiotic relationship is failing.

The built heritage is of "high value," marked by the use of local materials (granite and schist) in the constructions. The houses, granaries, bridges, and the religious heritage are some of the high-value built elements that make up these villages. In the middle of Parque do Alvão, the village of Lamas de Olo, for example, still retains various houses with thatched roofs.

3.2 Delimitation of areas with distinct landscape character: landscape units

The previous analysis exposed evident variations in the landscape character throughout the hydrographic basin of the Olo River. This led to the demarcation of three clearly distinct landscape units, as we can see in **Figure 4**.

These three regions will henceforth be called West Unit, located in the southwest of the river basin; Central Unit, located in the center; and East Unit, located in

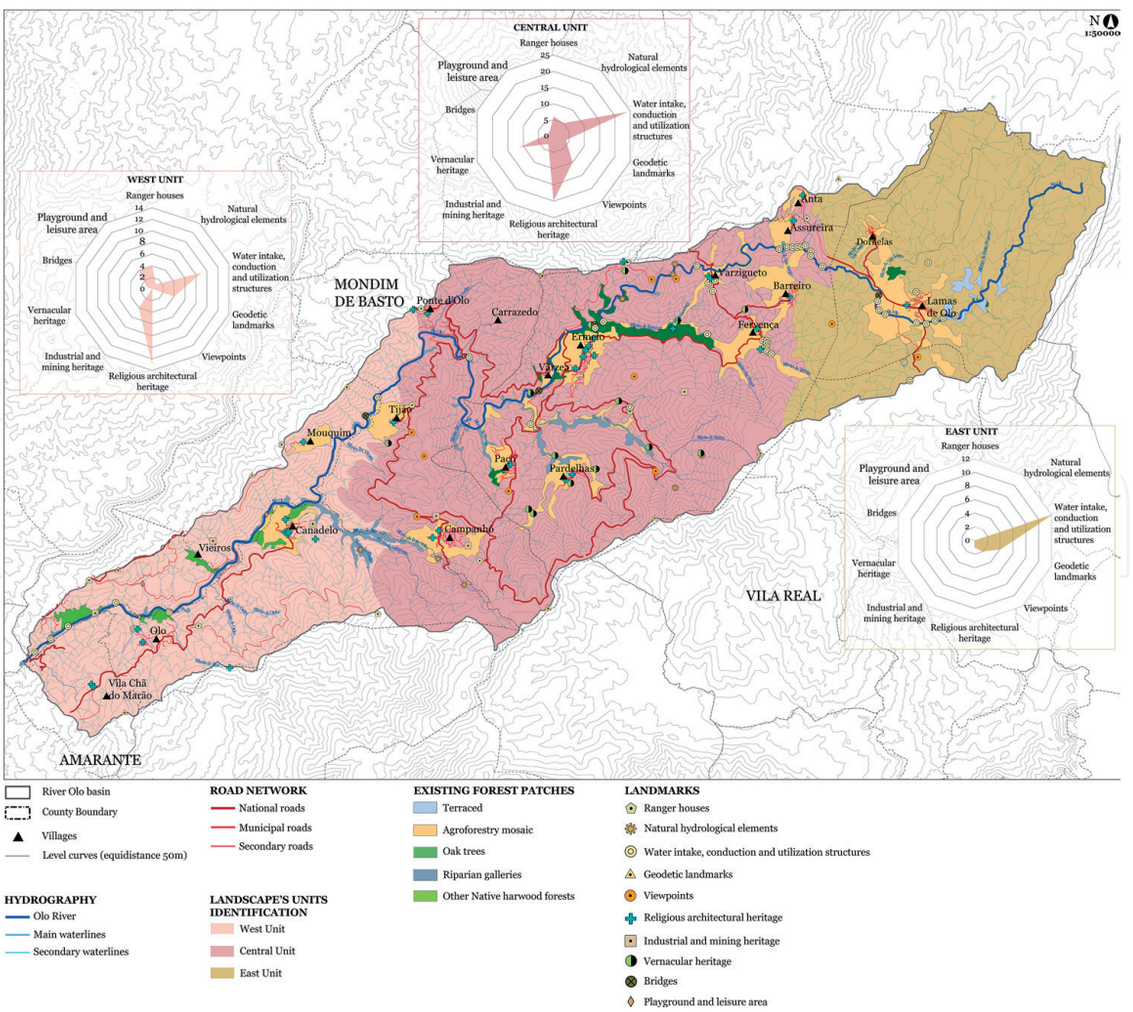


Figure 4.
Synthesis map displaying the landscape units identified in Olo river basin.

the far northeast. The West Unit is mainly characterized by the dominance of flat zones; only along the river, the terrain becomes steeper but always with relatively gentle slopes. We are at low altitudes, an ideal condition for agriculture and timber production. Along the Olo River, riparian galleries with native tree species dominate. It is an area where human settlements have been easier and have had more regular and continuous development over time.

The Central Unit is an area full of slopes and peaks, dominated by watercourses and by an agroforestry mosaic, developed in the surrounding villages. Human intervention is clearly visible in the widespread use of terraces with cultivated fields. Villages always have strategic locations, on top of a hill or in a valley, and are difficult to reach. Thanks to the presence of these differences in altitude, the Central Unit is rich in panoramic viewpoints, which gives it an added importance in terms of its potential for landscape appreciation. As in the West Unit, there are also abundant hardwood forests and riparian galleries, which give the place a special atmosphere.

The East Area is substantially different from the other two. We are at the highest altitudes and the territory is flat. Apart from the Olo River, there are no other predominant waterlines, and the lush vegetation of the open forests allows the development of a shrubbier vegetation adapted to the altitude. Most of this area is part of the Alvão Natural Park. In **Figure 5** two photographs of each landscape unit are presented.

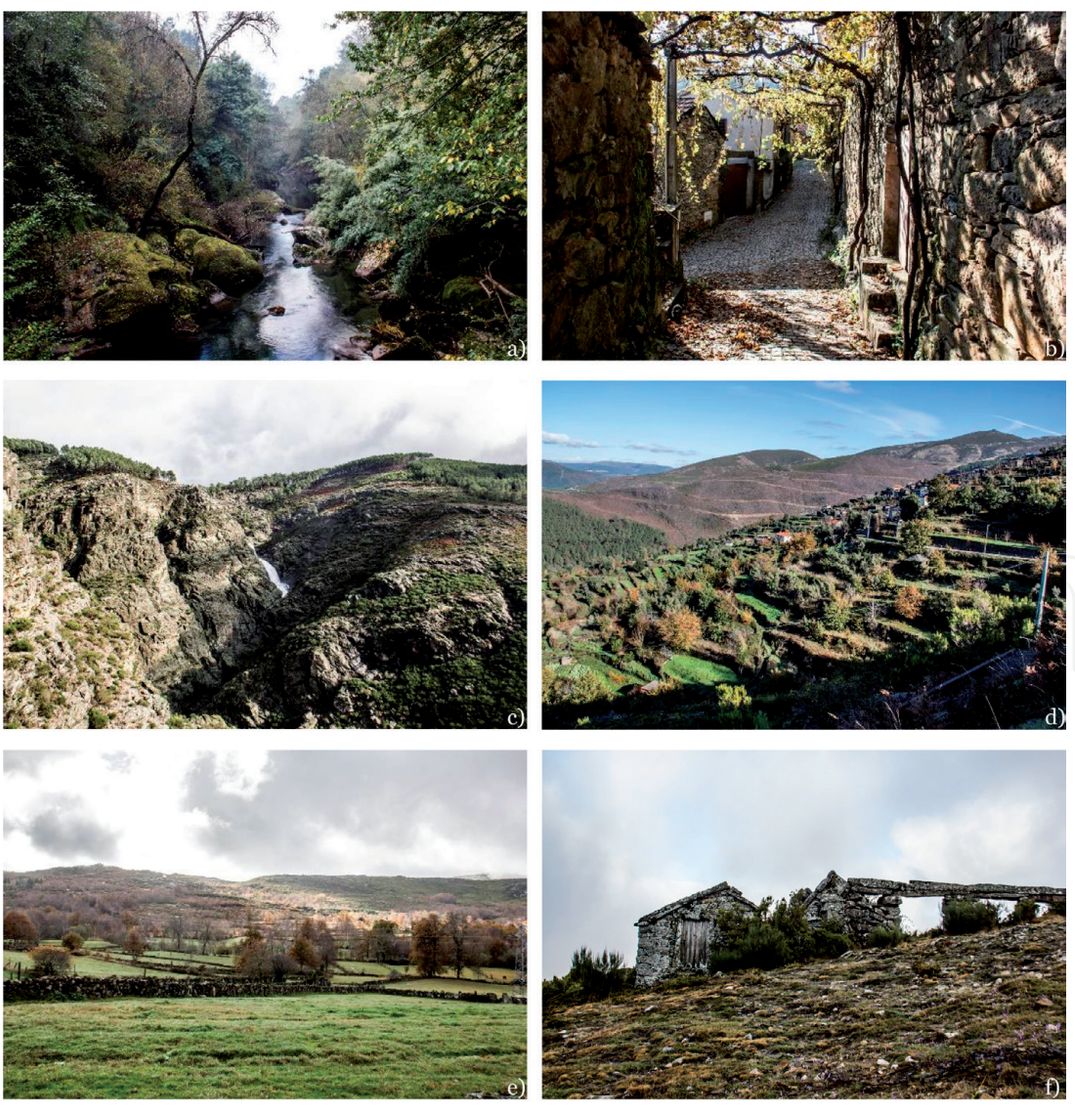


Figure 5.
Photographs of East landscape unit (a) and (b); Central landscape unit (c) and (d); and West landscape unit (e) and (f) (photo credit: Victor Esteves—OH!Land Studio).

The number and quality of landmarks were chosen to help select one of the landscape units for a downsized scale of analysis, in order to progress with the multiscale methodology. Following this approach, it was found that the Central Unit, with 145 landmarks, revealed the highest number, against 60 of the West Unit and 42 of the East Area. Central Landscape Unit was therefore chosen for a detailed assessment of the landmarks.

This unit, with 6832 ha, includes some of the foremost villages of the Olo river basin like Ermelo and Fervença. Fervença village developed close to one of the most important waterlines in this territory, Ribeira da Fervença, along which is possible to appreciate a remarkable forest of autochthonous species and a well-preserved terraced agricultural field. So, in this work, and to better explain the application of the methodology, this subunit Ribeira da Fervença was chosen to be studied in more detail in the next step.

3.3 Identification of key landscape points and requalification of strategic microsites and links

Zooming in Ribeira da Fervença subunit, it was possible to identify six key landscape points that represent places with a high concentration of landmarks needing requalification actions, that is, microsites (**Figure 6**). These landmarks

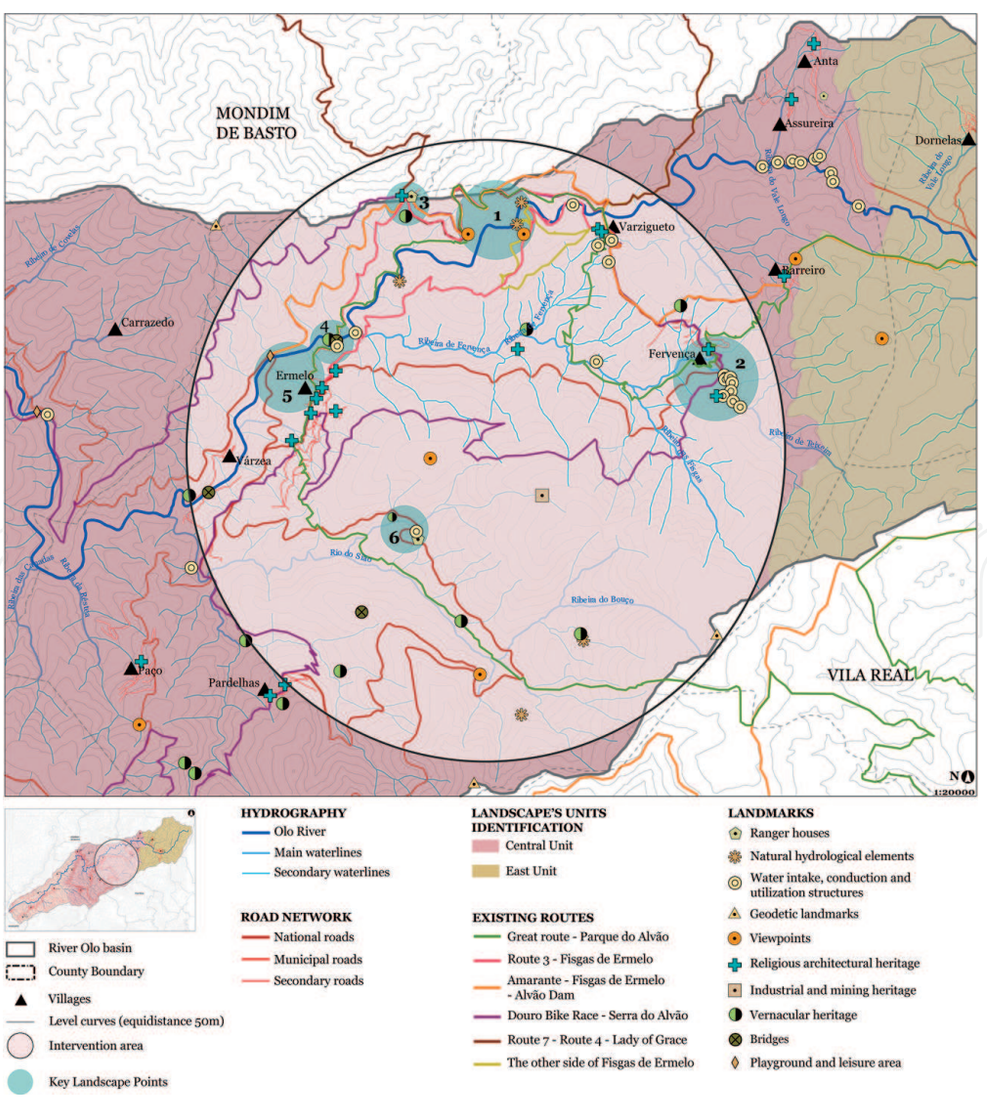
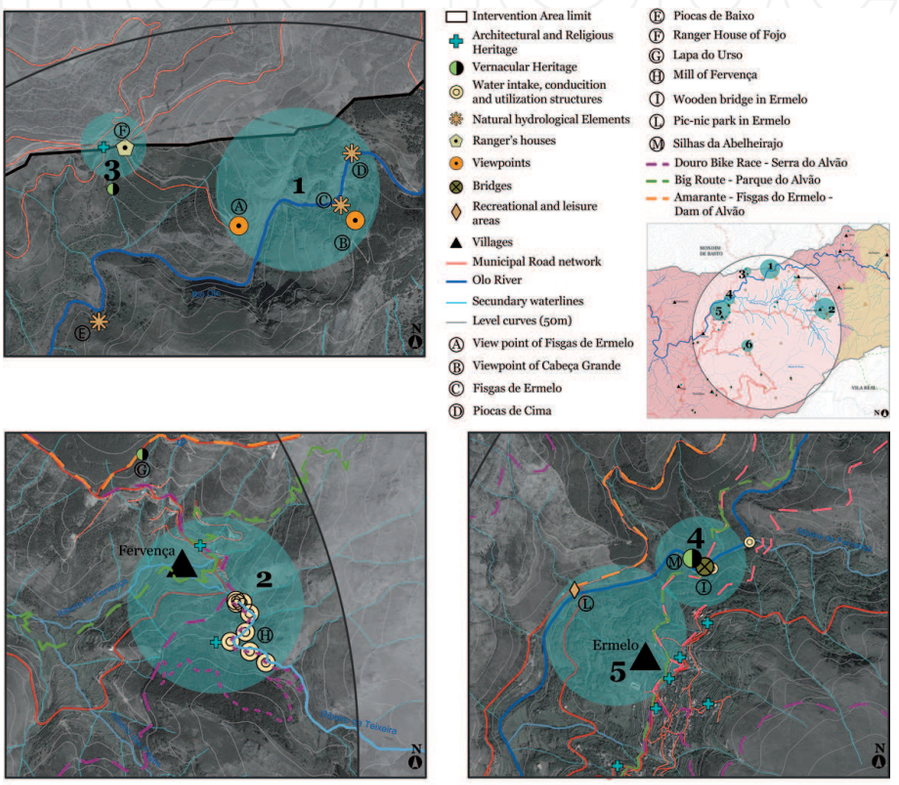


Figure 6.
Location of the six key landscape points in the Ribeira da Fervença subunit.

are prominent elements of the territory's natural and cultural heritage, very well known by the local community, and located along the existing route network.

Each key landscape point reveals a distinct combination of microsites. KLP 1 is rich in natural hydrological elements and in viewpoints; in KLP 2 it abounds water intake, conductions, and utilization structures as well as religious architectural heritage elements; in KLP 3 and KLP 6, it is located in a Ranger's House; in KLP 4 it's possible to observe vernacular heritage and traditional bridges; and KLP 5 includes recreational and leisure areas as well as the important village of Ermelo.

Summarizing, a total of nine different microsites, both natural and cultural, are foreseen for recovery actions. And for each of them, generic goals and specific



MICROSITES	OBJECTIVES	MEASURES
Rangers' Houses	**Boost regional supply of services and appropriated reception conditions for tourist associated with local values**	1) Requalify and adapt Rangers' Houses to environmental and landscape interpretation centers; 2) Promote recreational and educational activities for tourists through birdwatching, guided tours, plant and animals identification, bike tracking, hiking, etc; 3) Implement training programs to raise awareness on the importance of maintaining agricultural and grazing activities to prevent erosion, forest fires, and biodiversity loss, among other consequences of land abandonment
Recreational and Leisure Areas	**Encourage outdoor activities by improving accesses to better infrastructures**	1) Clean and maintain existing recreation and leisure areas; 2) Implement small green spaces in villages for physical activity, children's leisure, and community use; 3) Conceive new recreation and leisure spots in the vicinity of high environmental quality areas;
Viewpoints	**Promote the sights and scenic value of the landscape**	1) Improve accesses to infrastructures with high environmental and visual quality; 2) Clean and maintain existing viewpoints and introduction of information boards; 3) Install guard rails and requalify existing support equipment
Villages	**Perpetuate local settlements while keeping their historic character**	1) Rehabilitate abandoned residential buildings to accommodate tourists; 2) Renovate built structures of heritage interest, such as threshing floors, granaries, abandoned houses, churches, etc; 3) Improve villages links between them and out of the region
Bridges Vernacular Heritage	**Safeguard the historical and cultural heritage as a factor of identity and tourism potential**	1) Rebuild bridges and other vernacular structures; 2) Include these features in the walking routes plan to be designed
Natural Hydrological Elements	**Preserve the geological and ecological heritage as landscape identity elements, important for tourism promotion**	1) Restore riparian galleries and surrounding areas to be used by the population for low impact recreational use; 2) Develop the pedestrian and road access and increasing security through the installation of secured bodies
Paths	**Upgrade the existing network of walking routes to facilitate local and tourists' access and movement, to and within the region**	1) Design a restoration plan of existing walking routes articulated with other already implemented tourist routes and areas of interest; 2) Expand safe and accessible walking routes, in order to make it possible to visit the most important natural and cultural landmarks of the region;
Water intake, conduction and utilization structures	**Recover of constructed water features related to history and traditions**	1) Repair existing mills, dams, watermills and other water related structures; 2) Modify whenever possible and appropriate, to other functions related to handicraft activities 3) Create new walking routes to pass through cultural heritage

Note: The measures represented in KLP 3 can be also applied in KLP 6

Figure 7.
Location of the microsites in the key landscape points of Ribeira da Fervença and associated objectives and measures for their requalification.

measures to guide the interventions were produced (**Figure 7**). Specific measures can refer to operative improvements, for example, the restoration of the Ranger's House, or to strategic guidelines like those targeting to sensitize the population towards the impacts of field abandonment. Some photomontages were produced to better illustrate the tourist potential of these microsites after requalification (**Figure 8**).

3.4 Implementation of a local sustainable tourism network

Based on the green and blue infrastructure of the Olo river basin, and on the requalified microsites and links, it was possible to design a sustainable tourism network (**Figure 9**). It was confirmed the enormous potential of the Olo river basin for sustainable tourism: It is rich in crystal clear waterlines, and it has impressive waterfalls, a distinct native flora and fauna, very well-preserved habitats, and a long history and rooted traditions. There are plenty of natural blue and green corridors structured on a highly branched hydrographic network and full with riparian galleries.

Figure 8.
Photomontages illustrating the microsites after requalification actions. (a) Ranger's House adapted to landscape interpretation center; (b) refurbishment of a leisure area; (c) viewpoint with security guards and information boards; (d) houses rehabilitated with local materials and technics; (e) rehabilitation of bridges and paths improving walking routes; (f) secure enjoyment near nature and water courses.

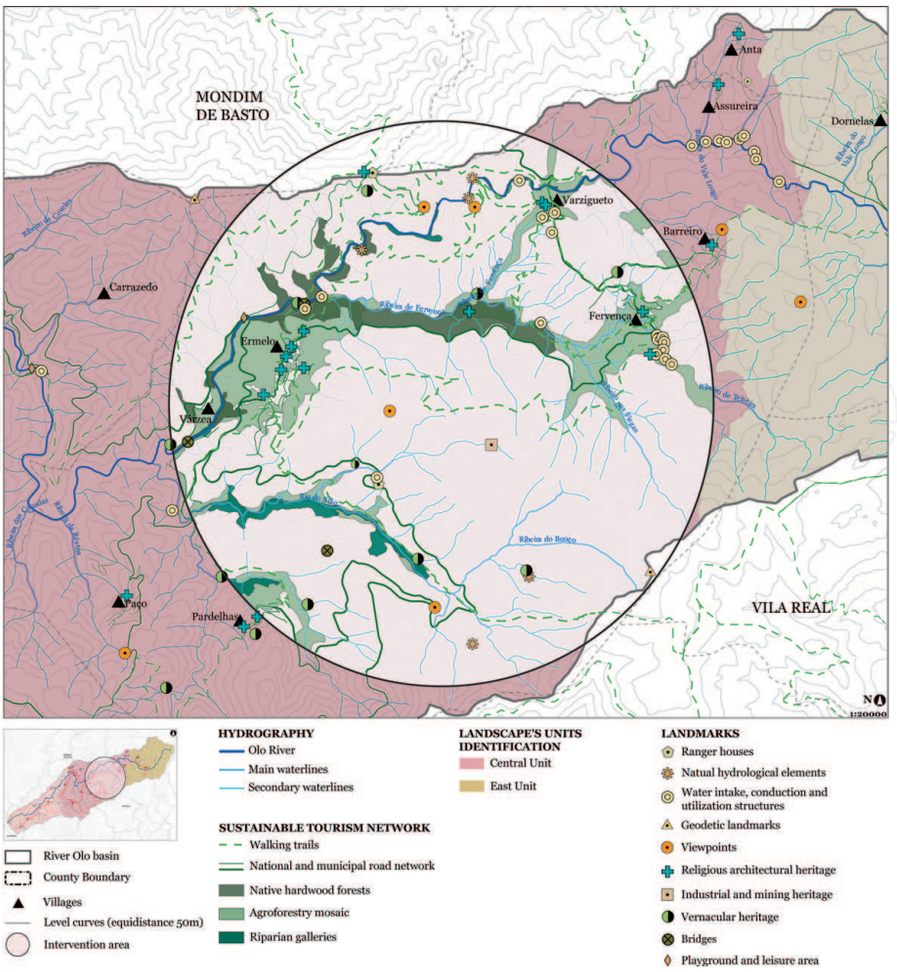


Figure 9.
Implementation of a sustainable tourism network in Ribeira da Fervença subunit.

Furthermore, an agroforestry mosaic very well balanced between terraced green fields supported by small schist walls and forests of native species forests guarantees an ecologic connectivity. To these green and blue infrastructures, an extensive network of unique cultural elements and links, rehabilitated in order to ensure easy and comfortable visitation and recreation, was now assembled. A sustainable tourism network was therefore implemented that simultaneously protects the natural heritage, recovers the cultural heritage, and respects local community's values and traditions.

4. Conclusions

Sustainable tourism is a new way of exploring destinations around the world, without damaging the balance of the planet's habitats and traditional ways of life of local populations. In this chapter it is also argued that sustainable tourism can revitalize depopulated rural landscapes and counter rural exodus by boosting local economy.

A multiscale methodology is here proposed as a strategy to acquire a deep knowledge on the natural and cultural values of rural regions towards the design of a sustainable tourism network. Green and blue infrastructures are assumed as the structuring matrix to which a network of rehabilitated cultural values and improved connections between them is added.

Resorting to the acupuncture metaphor, it is advocated that small-scale, short budget interventions in microsites located in key landscape points will allow a holistic revitalization of the whole region.

The methodology was tested in the Olo river basin, and its applicability was proved, although, for operational reasons, only one of the landscape units has been analyzed. The procedure will be easy to replicate for all identified landscape units, according to an intervention priority. It was therefore demonstrated that the multiscale character of the methodology enables its application in a wide range of landscapes and on different scales, allowing operating on both vast territories and on small regions.

The implementation of this strategy can lead to the creation of a long-term solution for rural remote regions, facing depopulation that is an integrated large-scale sustainable tourism network. This will help limit the waste of resources and minimize the negative impact of too invasive tourism.

A sustainable tourism network has the potential to relaunch local economy, improving the living conditions of the residents and allowing the creation of a very important tourist hub in the region. However, it should be emphasized that the success of any planning strategies is only achieved with the collaboration and active participation of different stakeholders: municipalities, public institutions linked to regional planning and landscape management, tourism-related companies, and small local businesses.

Acknowledgements

The authors would like to thank OH!Land Studio and to the Municipality of Amarante for inspiring and supporting this project. This research was carried out under the project Olo River—Living Laboratory for Sustainable Tourism and studies for the Characterization and Enhancement of the Landscape, funded by NORTE 2020 (2014–2020 North Portugal Regional Operational Program) and ERDF 2020 (European Regional Development Fund).

Author details

Cláudia Oliveira Fernandes* and Giulia Olivetti
Department of Geosciences, Environment and Spatial Planning, CIBIO-InBIO—Research Center in Biodiversity and Genetic Resources, School of Sciences, Associate Laboratory, University of Porto, Portugal

*Address all correspondence to: cofernandes@fc.up.pt

References

[1] Viñas CD. Depopulation processes in European rural areas: A case study of Cantabria (Spain). European Countries;**11**(3):341-369. DOI: 10.2478/euco-2019-0021

[2] Three-year Strategic Plan 2019-2020. Rewilding Europe. Amsterdam, The Netherlands; 2019. Available from: https://rewildingeurope.com/wp-content/uploads/2019/05/Rewilding-Europe-Strategic-Plan-2019-2021_website.pdf [Accessed: 25 March 2019]

[3] Fóti K. Quality of life in rural Europe—Key findings from the European Quality of Life Survey. ENRD Workshop on 'Combatting rural depopulation: Creating new opportunities for vibrant rural areas'. 2016

[4] Holden A, Lupton K. Experiencing and connecting to nature: An urban to rural association. In: Slocum SL, Kline C, editors. CAB Linking Urban and Rural Tourism: Strategies in Sustainability. 2017. DOI: 10.1079/9781786390141.0020

[5] Pollock A. Six reasons why mass tourism is unsustainable. The Guardian. 21 August 2013. Available from: https://www.theguardian.com/sustainable-business/six-reasons-mass-tourism-unsustainable. [Accessed: 10 December 2019]

[6] Peeters P, Gössling S, Klijs J, Milano C, Novelli M, Dijkmans C, et al. Overtourism: Impact and Possible Policy Responses. Brussels: European Parliament, Policy Department for Structural and Cohesion Policies; 2018. DOI: 10.2861/919195

[7] Sánchez-Cañizares SM, Castillo-Canalejo AM, Cabeza-Ramírez LJ. Sustainable tourism in sensitive areas: Bibliometric characterisation and content analysis of specialised literature. Sustainability. 2018;**10**:1525. DOI: 10.3390/su10051525

[8] World Tourism Organization. Sustainable Tourism for Development Guidebook—Enhancing Capacities for Sustainable Tourism for Development in Developing Countries. Madrid: UNWTO; 2013. DOI: 10.18111/9789284415496

[9] Anup KC. In: Butowski L, editor. Ecotourism and Its Role in Sustainable Development of Nepal, Tourism—From Empirical Research Towards Practical Application. Croatia: IntechOpen; 2016. DOI: 10.5772/62308 Available from: https://www.intechopen.com/books/tourism-from-empirical-research-towards-practical-application/ecotourism-and-its-role-in-sustainable-development-of-nepal

[10] Dileep MR. Tourism, Transport and Travel Management. Routledge; 2019. p. 470. DOI: 10.4324/9781315151069

[11] Drăgulănescu IV, Druțu M. Rural tourism for local economic development. International Journal of Academic Research in Accounting, Finance and Management Sciences. 2012;**2**(1):196-203. ISSN: 2225-8329

[12] Honey M. Ecotourism and Sustainable Development: Who Owns Paradise? Washington, D.C.: Island Press; 1999. DOI: 10.1177/004728759903800214

[13] Hill JL, Gale T. Ecotourism and environmental sustainability: An introduction. In: Ecotourism and Environmental Sustainability: Principles and Practice. Ashgaten Publishing Limited; 2009. pp. 259. DOI: 10.4324/9781315578767

[14] Ballantyne R, Packer J. International Handbook on Ecotourism. Edward

Elgar Publishing; 2013. DOI: 10.4337/9780857939975

[15] Seba J. Ecotourism and Sustainable Tourism: New Perspectives and Studies. Apple Academic Press, Inc.; 2011. DOI: 10.1201/b12233

[16] Austin G. Green Infrastructure for Landscape Planning: Integrating Human and Natural Systems. Routledge; 2014. DOI: 10.1080/14649357.2014.935608

[17] Naumann S, Davis M, Kaphengst T, Pieterse M, Rayment M. Design, implementation and cost elements of green infrastructure projects. Final report to the European Commission, DG Environment. 2011. Available from: https://op.europa.eu/en/publication-detail/-/publication/42fc9e33-2e83-49f8-a942-412e5a651f0f [Accessed: 06 January 2020]

[18] Millennium Ecosystem Assessment. Ecosystems and Human Well-being: Synthesis. Washington, DC: Island Press; 2005. Available from: https://www.millenniumassessment.org/documents/document.353.aspx.pdf [Accessed: 06 January 2020]

[19] Czechowski D, Hauck T, Hausladen G. Revising Green Infrastructure: Concepts Between Nature and Design. CRC Press, Taylor & Francis Group; 2015. DOI: 10.1201/b17639

[20] Firehock K. Strategic Green Infrastructure Planning: A Multi-Scale Approach. Island Press; 2015. DOI: 10.5822/978-1-61091-693-6

[21] Swanwick C. Landscape Character Assessment: Guidance for England and Scotland. Great Britain. Countryside Agency, Scottish Natural Heritage (Agency); 2002. Available from: https://www.nature.scot/landscape-character-assessment-guidance-england-and-scotland [Accessed: 06 August 2020]